



## Complete Summary

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### GUIDELINE TITLE

Assessment and device selection for vascular access.

### BIBLIOGRAPHIC SOURCE(S)

Registered Nurses Association of Ontario (RNAO). Assessment and device selection for vascular access. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2004 May. 67 p. [59 references]

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

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## SCOPE

### DISEASE/CONDITION(S)

Conditions requiring vascular access

### GUIDELINE CATEGORY

Counseling

Technology Assessment

### CLINICAL SPECIALTY

Nursing

### INTENDED USERS

Advanced Practice Nurses  
Nurses

GUIDELINE OBJECTIVE(S)

To provide evidence-based support for nurses related to client assessment and device selection, client education and documentation

TARGET POPULATION

Clients requiring infusion therapy in diverse practice settings, both institutional and community

Note: This guideline does not include recommendations related to the care of clients requiring infusion therapy through the following devices: arterial lines; fistulas for hemodialysis; pulmonary artery lines; pheresis lines; epidural catheters; pressure monitoring devices; umbilical artery; umbilical vein; and/or intraosseous lines.

INTERVENTIONS AND PRACTICES CONSIDERED

1. Comprehensive client assessment and development of a vascular access care plan prior to the initiation of therapy
2. Assessment of most appropriate type of vascular access device after consideration of multiple factors
3. Education of client and family regarding options for vascular access devices
4. Vascular access device selection in collaboration with client, family caregivers, and members of the health care team
5. Documentation of information regarding assessment of infusion therapy and device recommendations
6. Education, organization, and policy approaches and strategies

MAJOR OUTCOMES CONSIDERED

- Morbidity resulting from complications (e.g. infections, phlebitis) of vascular access device
- Costs
- Client outcomes

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)  
Searches of Electronic Databases  
Searches of Unpublished Data

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

A database search for existing infusion therapy guidelines was conducted by a university health sciences library. A subsequent search of the Medline, Embase and CINAHL databases was conducted for guidelines and articles published from

January 1, 1995 to November 2002 using the following search terms: "intravenous therapy", "infusion therapy", "IV therapy", "venous access", "practice guideline(s)", "clinical practice guideline(s)", "standards", "consensus statement(s)", "consensus", "evidence-based guidelines" and "best practice guidelines."

One individual searched an established list of Web sites for content related to the topic area. This list of sites, reviewed and updated in October 2002, was compiled based on existing knowledge of evidence-based practice Web sites, known guideline developers, and recommendations from the literature. The presence or absence of guidelines was noted for each site searched as well as the date searched. The Web sites at times did not house a guideline, but directed to another Web site or source for guideline retrieval. Guidelines were either downloaded if full versions were available or were ordered by phone/mail.

A Web site search for existing intravenous therapy guidelines was conducted via the search engine "Google", using the search terms identified above. One individual conducted this search, noting the search term results, the Web sites reviewed, date, and a summary of the findings. The search results were further critiqued by a second individual who identified guidelines and literature not previously retrieved.

Additionally, panel members were already in possession of a few of the identified guidelines. In some instances, a guideline was identified by panel members and not found through the previous search strategies. These were guidelines that were developed by local groups or specific professional associations.

The search method described above revealed nine guidelines, and numerous studies related to infusion therapy. The final step in determining whether the clinical practice guideline would be critically appraised was to have two individuals screen the guidelines based on specific inclusion criteria. These criteria were determined by panel consensus:

- Guideline was in English.
- Guideline was dated no earlier than 1996.
- Guideline was strictly about the topic areas.
- Guideline was evidence-based (e.g., contained references, description of evidence, sources of evidence).
- Guideline was available and accessible for retrieval.

Seven guidelines were deemed suitable for critical review using the "Appraisal of Guidelines for Research and Evaluation" instrument.

## NUMBER OF SOURCE DOCUMENTS

Following the appraisal process, the guideline development panel identified four guidelines, and related updates, to develop the recommendations cited in the guideline.

## METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

#### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Level of Evidence

I a - Evidence obtained from meta-analysis or systematic review of randomized controlled trials

I b - Evidence obtained from at least one randomized controlled trial

II a - Evidence obtained from at least one well-designed controlled study without randomization

II b - Evidence obtained from at least one other type of well-designed quasi-experimental study, without randomization

III - Evidence obtained from well-designed nonexperimental descriptive studies, such as comparative studies, correlation studies, and case studies

IV - Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities

#### METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

#### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

#### METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

#### DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

In January of 2003, a panel of nurses and researchers with expertise in infusion therapy practice and education from institutional and community settings (including vendor companies) was convened under the auspices of the Registered Nurses Association of Ontario (RNAO). At the onset the panel established the scope of the guideline through a process of discussion and consensus.

The panel members divided into subgroups to undergo specific activities using the short-listed guidelines, other literature, and additional resources for the purpose of drafting recommendations for nursing interventions. This process yielded a draft set of recommendations.

#### RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

#### COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

#### METHOD OF GUIDELINE VALIDATION

External Peer Review

Internal Peer Review

#### DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The panel members as a whole reviewed the recommendations, discussed gaps and available evidence, and came to consensus on a draft guideline.

This draft document was submitted to a set of external stakeholders for review and feedback. Stakeholders represented various health care professional disciplines, clients and families, as well as professional associations. External stakeholders were provided with specific questions for comment, as well as the opportunity to give overall feedback and general impressions. The results were compiled and reviewed by the development panel—discussion and consensus resulted in revisions to the draft document prior to publication and evaluation.

### RECOMMENDATIONS

#### MAJOR RECOMMENDATIONS

The levels of evidence supporting the recommendations (Ia, Ib, IIa, IIb, III, IV) are defined at the end of the "Major Recommendations" field.

	Recommendation	Level of Evidence
Practice Recommendations	Assessment and Device Selection  1. All clients requiring vascular access, regardless of duration of therapy, require the use of a structured approach such as an algorithm to facilitate a comprehensive client assessment and the development of a vascular access care plan prior to the initiation of therapy.	IIb
	2. To determine the most appropriate type of vascular access device, the nurse needs to	

	Recommendation	Level of Evidence
	<p>consider the following factors:</p> <ul style="list-style-type: none"> <li>• Prescribed therapy – Level Ib</li> <li>• Duration of therapy – Level Ib</li> <li>• Physical assessment – Level IV</li> <li>• Client health history – Level IV</li> <li>• Support system/resources – Level IV</li> <li>• Device availability – Level IV</li> <li>• Client preference – Level IV</li> </ul>	
	<p>Client Education</p> <p>3. Nurses will discuss the options for vascular access devices with the client and family caregivers. Device selection is a collaborative process between the nurse, client, physician and other members of the health care team; however, the nurse has a role to educate and advocate for clients in relation to the selection of appropriate devices.</p>	IV
	<p>Documentation</p> <p>4. Nurses will document comprehensive information regarding assessment of infusion therapy and device recommendations. This documentation should include, as a minimum:</p> <ul style="list-style-type: none"> <li>• Assessment completed and the written plan of care developed; and</li> <li>• Client and family caregiver education.</li> </ul>	IV
Education Recommendation	<p>5. The principles and practice of infusion therapy should be included in the basic education of nurses in their core curriculum, be available as continuing education, be provided in orientation to new organizations, and be made available through continuing professional development opportunities.</p>	IV
Organization and Policy Recommendation	<p>6. Health care organizations should have access to infusion therapy nursing expertise to support optimal vascular access outcomes.</p>	III

	Recommendation	Level of Evidence
ons	7. Health care organizations must have quality improvement systems in place to monitor client outcomes. This should include an interdisciplinary process that will monitor quality indicators related to vascular access and infusion therapy, the provision of timely feedback for improved client outcomes, and systems for reporting and capturing data to support practice improvements.	IV
	<p>8. In order to support continuity of client care within and between organizations, all clients with a vascular access device and/or their caregivers need to have available comprehensive information about the device, which should include, as a minimum:</p> <ul style="list-style-type: none"> <li>• Details of therapy</li> <li>• Type of vascular access device, including number of lumens</li> <li>• Date of insertion</li> <li>• Tip location, for all central vascular access devices</li> <li>• Delivery system in use</li> <li>• Client education plan</li> <li>• Client specific instructions</li> <li>• Details of any complications experienced</li> <li>• Appropriate resources, as required</li> </ul>	IV
	<p>9. Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. Organizations may wish to develop a plan for implementation that includes:</p> <ul style="list-style-type: none"> <li>• An assessment of organizational readiness and barriers to education</li> <li>• Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process</li> <li>• Dedication of a qualified individual to provide the support needed for the education and implementation process</li> </ul>	IV

	Recommendation	Level of Evidence
	<ul style="list-style-type: none"> <li>• Ongoing opportunities for discussion and education to reinforce the importance of best practices</li> <li>• Opportunities for reflection on personal and organizational experience in implementing guidelines</li> </ul>	

### Definitions:

#### Level of Evidence

I a - Evidence obtained from meta-analysis or systematic review of randomized controlled trials

I b - Evidence obtained from at least one randomized controlled trial

II a - Evidence obtained from at least one well-designed controlled study without randomization

II b - Evidence obtained from at least one other type of well-designed quasi-experimental study, without randomization

III - Evidence obtained from well-designed nonexperimental descriptive studies, such as comparative studies, correlation studies, and case studies

IV - Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities

#### CLINICAL ALGORITHM(S)

An algorithm is provided in the original guideline document for assessment and device selection.

### EVIDENCE SUPPORTING THE RECOMMENDATIONS

#### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence is provided for each recommendation (see "Major recommendations").

### BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

#### POTENTIAL BENEFITS



Nurses with special training in infusion therapy and vascular access device care and practice, along with supportive organizational structures and processes, result in improved client outcomes and decreased costs, morbidity, and complications associated with infusion therapy.

## POTENTIAL HARMS

Not stated

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- The document needs to be reviewed and applied, based on the specific needs of the organization or practice setting/environment, as well as the needs and wishes of the client. Guidelines should not be applied in a "cookbook" fashion but used as a tool to assist in decision making for individualized client care, as well as ensuring that appropriate structures and supports are in place to provide the best possible care.
- These best practice guidelines are related only to nursing practice and not intended to take into account fiscal efficiencies. These guidelines are not binding for nurses and their use should be flexible to accommodate client/family wishes and local circumstances. They neither constitute a liability nor discharge from liability. While every effort has been made to ensure the accuracy of the contents at the time of publication, neither the authors nor the Registered Nurses Association of Ontario (RNAO) give any guarantee as to the accuracy of the information contained in them nor accept any liability, with respect to loss, damage, injury, or expense arising from any such errors or omission in the contents of this work. Any reference throughout the document to specific pharmaceutical products as examples does not imply endorsement of any of these products.
- Best practice guidelines are systematically developed statements to assist practitioners' and clients' decisions about appropriate health care. This best practice guideline focuses on assisting all nurses providing care to clients requiring infusion therapy in diverse practice settings, both institutional and community. This guideline incorporates best practices related to client assessment and appropriate device selection, which is applicable to all clients requiring vascular access. Nurses working in specialty areas such as pediatrics, gerontology, oncology, and dialysis will require further practice direction from guidelines in their unique area of practice. This guideline does not include recommendations related to the care of clients requiring infusion therapy through the following devices: arterial lines; fistulas for hemodialysis; pulmonary artery lines; pheresis lines; epidural catheters; pressure monitoring devices; umbilical artery; umbilical vein; and/or intraosseous lines.
- It is acknowledged that the individual competencies of nurses varies between nurses and across categories of nursing professionals (registered practical nurses [RPNs] and registered nurses [RNs]) and are based on knowledge, skills, attitudes, critical analysis and decision making which are enhanced over time by experience and education. It is expected that individual nurses will perform only those aspects of assessment and device selection for which they have appropriate education and experience. It is expected that nurses will

seek appropriate consultation in instances where the client's care needs surpass the individual's ability to act independently. It is acknowledged that effective health care depends on a coordinated interdisciplinary approach incorporating ongoing communication between health professionals and clients, ever mindful of the personal preferences and unique needs of each individual client.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

Best practice guidelines can only be successfully implemented if there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. Registered Nurses Association of Ontario (RNAO), through a panel of nurses, researchers, and administrators has developed a Toolkit: Implementation of Clinical Practice Guidelines based on available evidence, theoretical perspectives and consensus. The Toolkit is recommended for guiding the implementation of any clinical practice guideline in a health care organization.

The Toolkit provides step-by-step directions to individuals and groups involved in planning, coordinating, and facilitating guideline implementation. Specifically, the Toolkit addresses the following key steps:

1. Identifying a well-developed, evidence-based clinical practice guideline
2. Identification, assessment, and engagement of stakeholders
3. Assessment of environmental readiness for guideline implementation
4. Identifying and planning evidence-based implementation strategies
5. Planning and implementing evaluation
6. Identifying and securing required resources for implementation

Implementing practice guidelines that result in successful practice changes and positive clinical impact is a complex undertaking. The Toolkit is one key resource for managing this process.

### Evaluation and Monitoring

Organizations implementing the recommendations in this nursing best practice guideline are advised to consider how the implementation and its impact will be monitored and evaluated. A table found in the original guideline document, based on the framework outlined in the RNAO Toolkit: Implementation of Clinical Practice Guidelines, illustrates some suggested indicators for monitoring and evaluation.

### IMPLEMENTATION TOOLS

Clinical Algorithm  
Tool Kits

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Staying Healthy

### IOM DOMAIN

Effectiveness  
Patient-centeredness  
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Registered Nurses Association of Ontario (RNAO). Assessment and device selection for vascular access. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2004 May. 67 p. [59 references]

### ADAPTATION

The panel, following the appraisal process, identified the following guidelines, and related updates, to adapt and modify recommendations:

- Centers for Disease Control and Prevention (2002). Guidelines for the prevention of intravascular catheter-related infections. Morbidity and Mortality Weekly Report, 51(RR-10), 1-29.
- Evidence Based Practice in Infection Control (2001). The epic Project: Developing national evidence-based guidelines for preventing hospital-acquired infections. Guidelines for preventing infections associated with the insertion and maintenance of central venous catheters. Journal of Hospital Infection, 47(Suppl.), S1-S82.
- Health Canada Population and Public Health Branch (1997). Preventing infections associated with indwelling intravascular access devices. Canada Communicable Disease Report [Online]. Available: [http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s8/iiadb\\_e.html](http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s8/iiadb_e.html).
- Intravenous Nurses Society (2000). Infusion nursing: Standards of practice. Journal of Intravenous Nursing, 23(6S), S1-S88.

### DATE RELEASED

2004 May

### GUIDELINE DEVELOPER(S)

Registered Nurses Association of Ontario - Professional Association

## SOURCE(S) OF FUNDING

Funding was provided by the Ontario Ministry of Health and Long Term Care.

## GUIDELINE COMMITTEE

Not stated

## COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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#### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Declarations of interest and confidentiality were made by all members of the guideline development panel. Further details are available from the Registered Nurses Association of Ontario (RNAO).

#### GUIDELINE STATUS

This is the current release of the guideline.

## GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Registered Nurses Association of Ontario \(RNAO\) Web site](#).

Print copies: Available from the Registered Nurses Association of Ontario (RNAO), Nursing Best Practice Guidelines Project, 158 Pearl Street, Toronto, Ontario M5H 1L3.

## AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Summary of recommendations. Assessment and device selection for vascular access. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2004 May. 3 p.

Electronic copies: Available in Portable Document Format (PDF) from the [Registered Association of Ontario \(RNAO\) Web site](#).

- Toolkit: implementation of clinical practice guidelines. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2002 Mar. 88 p.

Electronic copies: Available in Portable Document Format (PDF) from the [Registered Nurses Association of Ontario \(RNAO\) Web site](#).

Print copies: Available from the Registered Nurses Association of Ontario (RNAO), Nursing Best Practice Guidelines Project, 158 Pearl Street, Toronto, Ontario M5H 1L3.

## PATIENT RESOURCES

None available

## NGC STATUS

This NGC summary was completed by ECRI on November 2, 2004. The information was verified by the guideline developer on November 23, 2004.

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Registered Nurses Association of Ontario (2004). Assessment and device selection for vascular access. Toronto, Canada: Registered Nurses Association of Ontario.

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